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SCIENCE NEWS LETTER

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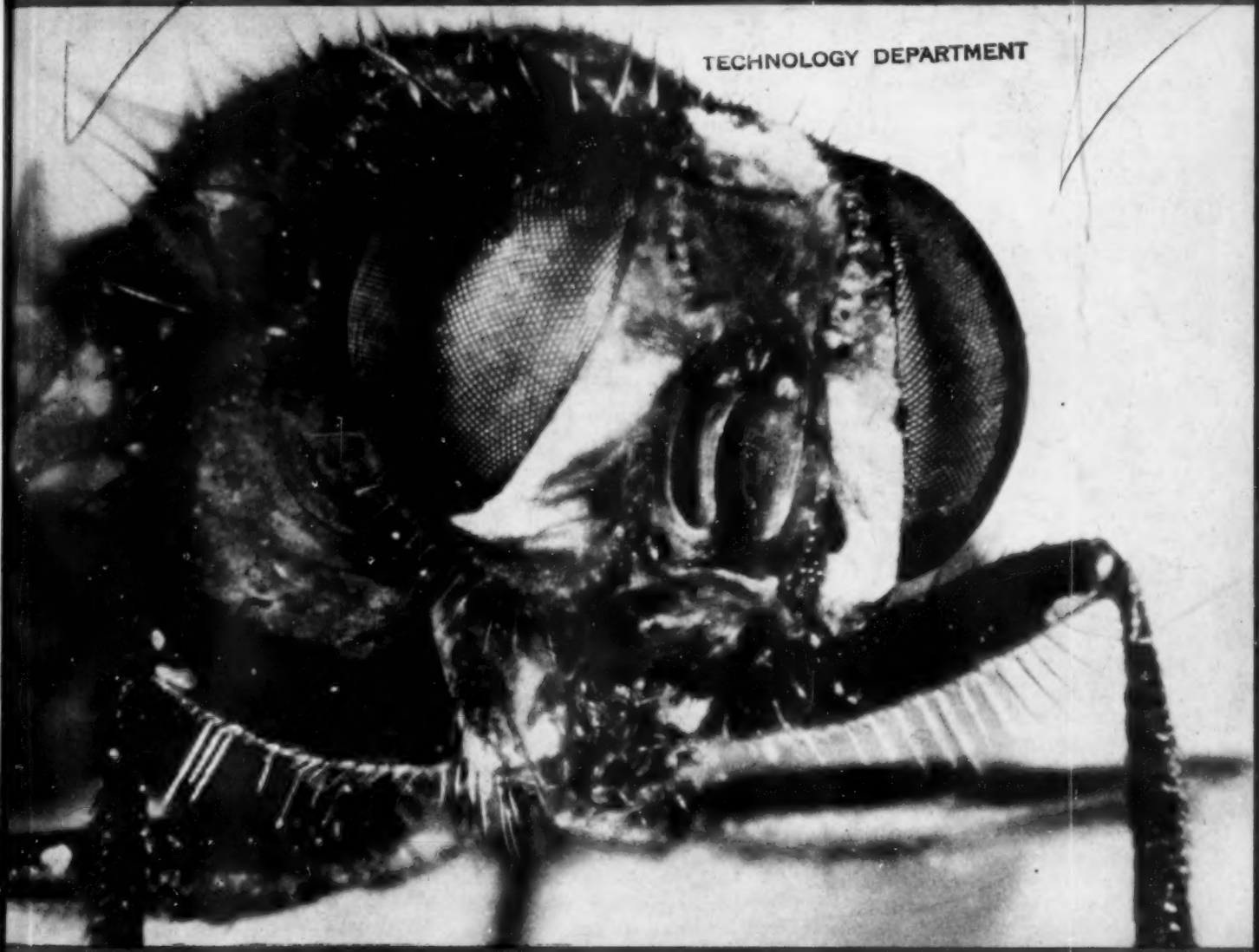

Your Enemy

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A SCIENCE SERVICE PUBLICATION

RADIOACTIVITY

Isotopes Needed Abroad

Federation of American Scientists has urged the Atomic Energy Commission to make radioactive isotopes available to foreign scientists.

➤ RADIOACTIVE isotopes from America's uranium piles should be made available for scientific research anywhere in the world, the Federation of American Scientists has declared in an appeal to the U.S. Atomic Energy Commission.

A letter from the Federation council, signed by 13 American leaders in science, asks the Commission to make available radioactive materials "which are not involved in the production of weapons . . . (to) . . . responsible scientists and institutions throughout the world as soon as possible."

The letter makes a special appeal for radioactive carbon 14 for the Curie Laboratory in Paris. Irene Curie, co-discoverer of radioactivity and daughter of Marie Curie, is the director of the laboratory.

"The inexpensive quantity production of these materials in uranium piles now opens new vistas in fundamental research, and in the study and control of disease," the letter states in urging international distribution of radioisotopes.

"American science and medicine will profit, as they have in the past, by such a stimulation to world-wide study," the American scientists said.

"Even more important will be the clear evidence of our desire to place our unique resources at the service of mankind," continued the letter.

The scientists quoted a European delegate to the United Nations Atomic Energy Commission as saying that the first shipments, before the war, of heavy water from this country to Europe were "the best ambassadors of good will and international cooperation that American scientists could have sent to their European colleagues."

In calling for the shipment of radioactive carbon to the Curie Laboratory, the scientists said the situation "offers a unique opportunity, a peculiarly fitting setting, for dramatizing our national intention and for offsetting to some extent the ill feeling which restrictions upon science in this country have engendered abroad."

Science News Letter, June 21, 1947

CHEMISTRY

Colloids in Food Industry

➤ IF HARD water must be used in making mayonnaise dressing, add a little more mustard.

That isn't just a rule-of-thumb kitchen trick; there's real science in it. The mustard is an emulsifying agent, introducing a new set of electrical charges that latch onto the trouble-making calcium ions in the hard water and get them out of the way.

This was one of the practical ways in which a knowledge of colloid chemistry helps in the food industries, Prof. Ernst A. Hauser of the Massachusetts Institute of Technology told the meeting in Boston of the Association of Food Technologists.

Colloids, and their near relatives, emulsions, are intimate mixtures of two or more liquid substances in droplet or other finely divided phase, and their chemistry is to a considerable extent a study of the interrelations of the electrical charges borne by these minute particles. Familiar examples among foods are salad dressings, cheese, jellies, custard pie fillings and cornstarch puddings. It is tragedy enough to a housewife if a dozen glasses of jelly won't jell, but it may mean bankruptcy to a manufacturer if it happens to a hundred thousand dozen glasses. That's why he has to be right the first time, and there's where a knowledge of colloid chemistry can help him.

"Another problem with which the food industries are confronted was only recently brought to my attention by Dr. Cecil E. Dunn," the speaker continued. "The use of detergents for the cleaning of soiled glassware or metal containers is based exclusively on colloidal phenomena. However, what struck me most was a statement made by a member of the audience to the effect that he could not understand why a wetting agent like hexametaphosphate cleans bottles better than a solution of sodium hydroxide.

"The colloid chemist has the answer quite handy. The phosphate is adsorbed on the surface of the particles which will deposit on the glass or tin. Their electric charge is thereby increased and this will result in their rapid dispersion and removal by washing."

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GENERAL SCIENCE

Independent Research Important in Industry

➤ INDEPENDENT laboratories for scientific research and testing play an important part in America's industrial advancement, a recent survey of their work shows. The survey was made by the American Council of Commerical Laboratories to obtain information for a report to the President's Scientific Research Board.

There are approximately 275 such laboratories. They employ some 5,000 persons, the majority of whom are scientists and technicians. This figure does not include the approximate 2,000 laboratories maintained by individual corporations and other manufacturers and producers. These exist primarily for the companies which operate them. The independent laboratories are for smaller companies, and are ready to tackle almost any scientific industrial problem presented to them. Work already accomplished extends from metals and foodstuffs to packaging and paints.

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ENGINEERING

Sailors to Be Protected By Plastic "Greenhouse"

➤ SAILORS on the exposed bridges of future Navy ships may be protected from blast, weather and fumes by a transparent plastic "greenhouse."

First installation of the plastic shelter is being completed on the light cruiser USS Manchester, now enroute to Newport, R. I., from the Mediterranean.

Plastic panels mounted in a metal framework are being used. If the "greenhouse" passes its tests, the life of a Navy sailor will be more pleasant, and perhaps longer.

The plastic blast-and-weather hood was designed and constructed at the Navy Shipyard in Boston. Plastics being tested are acrylic resins.

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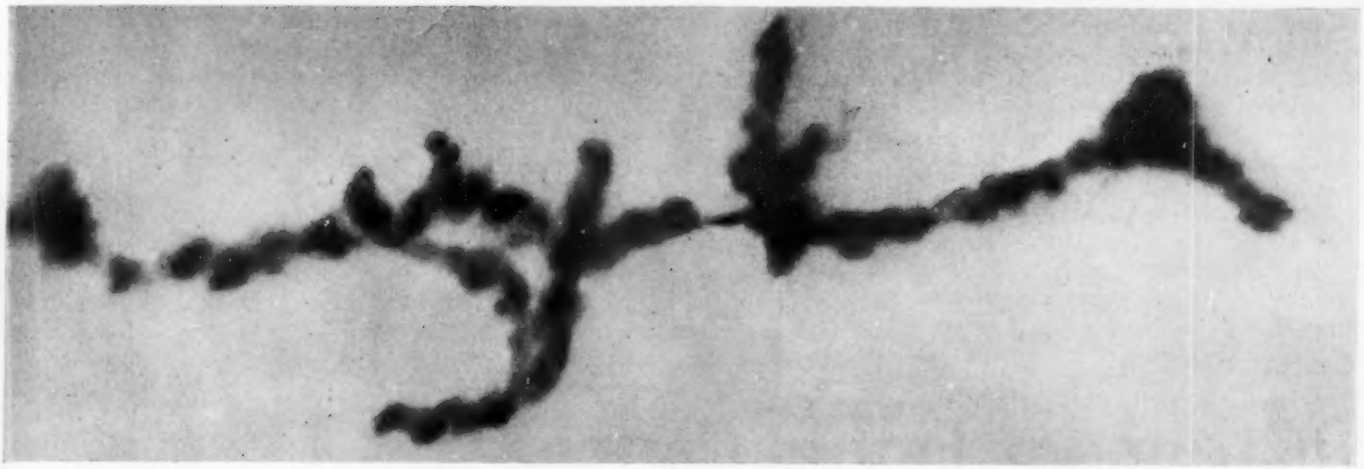

CHROMOSOME PHOTOGRAPHED—This picture showing the structure of gene-carrying matter was taken by an electron microscope.

MEDICINE

Clues to Stomach Cancer

Simple indications lead to detection of stomach cancer if they are given attention early. Cancer can be removed before it grows large.

Highlights of the American Medical Association's centennial meeting, covered for Science Service by Jane Stafford, can be found on pages 387 through 390 and page 392.

➤ NEW CLUES for detection of stomach cancer before it becomes incurable were presented by Dr. Gilson Colby Engel of Philadelphia at the meeting in Atlantic City of the American Medical Association.

The clues are so simple that the average patient and doctor might overlook their significance. They are: a weak and tired feeling; loss of appetite, particularly for meat; and a mild kind of indigestion or stomach discomfort that comes either before or after eating.

Stomach cancer is at present one of the most hopeless forms of this disease. It kills 38,000 persons a year in the United States, more than any other kind of cancer. One person dies of stomach cancer every 18 minutes.

This "startling" high mortality rate can be reduced, Dr. Engel stated.

Stomach cancer can be cured by an operation to remove the cancer, if the patient gets to the surgeon before the cancer has grown so large and spread so far through the body that it is too late.

The operation, even when the entire stomach is removed, carries a mortality rate of only 18%. If only part of the stomach needs to be removed, the mortality is less than three percent. But without the operation, mortality for stomach cancer is 100%.

Pain, loss of weight, anemia, nausea and vomiting of blood are not reliable early signs of stomach cancer. In the majority of cases, they appear too late.

For saving the thousands of lives taken each year by stomach cancer, Dr. Engel urged the following procedures:

1. Patients to see their doctors if stomach symptoms of any kind, or a weak, tired feeling or loss of appetite lasts more than two weeks.

2. Doctors to make X-ray studies at once on patients complaining of these symptoms. "You must not forget that the patient has tried all the medical preparations and vitamins before he came to you," Dr. Engel warned.

3. Every annual physical check-up to include X-rays of the stomach.

4. Operation to be done on any patient diagnosed as having stomach ulcer in whom after four weeks of medical treatment X-rays show the ulcer still present even if the patient no longer has symptoms.

Many patients with stomach cancer, Dr. Engel said, are relieved of symptoms by medical treatment for stomach ulcers. But the relief is only temporary. And when next they have pain, indigestion and other symptoms, the cancer has reached the hopeless stage. It is because of this danger, when early stomach cancer is mistaken for stomach ulcer, that he urged operation if the supposed ulcer still shows on the X-ray picture after four weeks, even when the patient's symptoms have been relieved.

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GENETICS

Knowledge About Heredity From Photograph Studies

➤ THIS PICTURE, which an imaginative youngster might tell you is a Jubjub Bird fleeing from a Fruminous Bandersnatch, is in sober actuality a record of the newest triumph of that almost fabulously powerful research tool, the electron microscope. It is the first electron microscope photograph of chromosome details to be published in a newspaper. Similar photographs were published in *Science* (June 13).

Chromosomes, as you may recall, are the extremely minute particles of living matter in the nuclei or centers of cells that carry the units of heredity, or genes. Genes determine whether you are blonde or brunette, tall or short. They are so small that even the most powerful of ordinary microscopes fail to give sufficiently large-scale views of their details. But they are so fragile and delicate that there seemed no way to lay them out properly for the bombardment with electron streams that makes pictures in the electron microscope.

The problem was finally solved by Prof. John T. Buchholz, head of the botany department at the University of Illinois. Using instruments so fine-

pointed that their operation has to be guided through a microscope, he dissected several types of plant cells, snared out their chromosomal threads and laid them on the electron microscope's specimen holder. The chromosomal material dried and hardened sufficiently to withstand the brief but intense electron bombardment.

The chromosomal threads shown here, at originally photographed 30,000 times their actual size, were taken out of one of the pollen-forming cells in the tassel of a corn-stalk. The darker, bead-like masses may be the actual genes, or at least the places where these elusive ultimate units of heredity reside. They appear to be strung together on a ribbon-like uniting filament, much smaller than the dark masses.

Now that a method for getting photographs of chromosomes has been developed, it can be expected that it will be used in obtaining a more exact knowledge of heredity.

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MEDICINE

Instrument Fights Cancer

Bronchoscope is used to diagnose lung cancer and may save hundreds of persons a year in the U. S. This method succeeds when others fail.

➤ A NEW WAY to fight cancer was announced by Drs. Louis H. Clerf and Peter A. Herbut of Jefferson Hospital, Philadelphia, at the meeting in Atlantic City of the American Medical Association.

A quarter or more of the 6,000 persons who die of lung cancer every year in the United States may be saved as a result.

An instrument familiar to doctors and to many parents is the chief weapon that will save more and more lung cancer victims. The instrument is the bronchoscope, a long, narrow, hollow tube that reaches down the windpipe to the lungs. It has already saved thousands of lives of children who accidentally sucked toy whistles or safety pins or buttons into their lungs.

Now the bronchoscope can be used to suck out microscopic bits of tissue from the farthest parts of the lungs. Examined under the microscope, these bits of tissue will tell whether or not the patient has a cancer in his lungs.

The cancer can be detected in this way when no other method will reveal its presence. If the cancer is found early enough, the patient can be saved by having the cancer or the entire lung removed.

First sign of lung cancer that takes a patient to his doctor is a dry cough. He may spit a little blood. X-rays of his chest may or may not have a suspicious shadow. But all these signs may mean some condition other than cancer. They may mean tuberculosis.

A tiny forceps attached to the end of the bronchoscope will pinch out a bit of tissue for examination if the cancer is near enough the windpipe to be reached by the bronchoscope.

When it is way off at the edge of the lungs, Drs. Clerf and Herbut shoot a little salt solution through the bronchoscope and suck it back out again. If the cancer is present, a few cells shed by the cancer, the way the skin normally sloughs off cells, will be sucked out in the salt solution. They can be identified under the microscope and the diagnosis made.

In the past year, Drs. Clerf and Herbut have detected 32 cancers, out of a group of 118, that had not been detected by any other method.

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MEDICINE

Test for Pregnancy Gives Answer in Only Two Hours

➤ A TEST for pregnancy that gives the answer in only two hours was announced by Drs. Herbert Kupperman and Robert B. Greenblatt of the University of Georgia School of Medicine to the American Medical Association meeting in Atlantic City.

The test is made by injecting a few drops of the woman's kidney excretion into an immature rat. Two hours later the rat is killed by an overdose of ether. If the rat's ovaries are red and engorged with blood, the woman is pregnant.

The test has been done for more than 1,200 patients. It was accurate in 99.8% of the cases.

Prime purpose of the test is not just to tell a healthy woman that she is going to have a baby but to give the doctor a chance to save life in cases of ectopic pregnancy. In these cases, the baby is developing in the mother's body but outside the womb. This unnatural state of affairs endangers the baby and the mother, too. In many cases, speedy operation can save the mother.

The signs of this condition may be mistaken for appendicitis or for tumors. The new two-hour test will give the diagnosis between the time the patient is brought into the hospital and the doctor and patient are scrubbed up and prepared for the operation. Other pregnancy tests take from six to 96 hours.

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SCIENCE NEWS LETTER
Vol. 51 JUNE 21, 1947 *No. 25*

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566, and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE

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MEDICINE

Results of Sleeplessness

Changes confined to brain. May involve same mechanism as schizophrenia. One night's sleep restores voluntary victim of insomnia to normal.

➤ GOING for five days and nights without sleep can make a healthy young man "see things," laugh and talk crazily, and show other symptoms of the serious mental disease, schizophrenia.

But one night's sleep restores the voluntary victim of sleeplessness, or insomnia, to normal, Dr. David B. Tyler of the Army Chemical Center's Medical Division at Edgewood, Md., Arsenal reported at the American Medical Association's centennial meeting in Atlantic City.

Hundreds of soldiers, marines and conscientious objectors took part in the studies, made to learn how long men in combat could stay awake and remain efficient fighters.

Better understanding of mental disease may come from clues furnished by the study.

"We feel there is a relation between the mechanism in the brain that produces changes as a result of sleeplessness and the mechanism that produces the disturbances in schizophrenia," Dr. Tyler said.

All the changes produced by the five days and nights without sleep were confined to the brain. They showed up after about 36 hours of sleeplessness. Seeing double, hallucinations, irritability, unreasonable laughter and irrelevant conversation, memory deterioration and remarks made as if the men were in a dream state were the signs of mental change.

Brain-wave records also showed the effects of the long time without sleep.

Heart rate, blood pressure, body temperature, visual ability, and capacity to do physical work were not impaired by the prolonged period without sleep. The men actually gained weight, but this was because they were given a fourth meal at midnight.

Reaction time and steadiness were just as good on short tests, but fell off when the tests were prolonged. Benzedrine, familiarly known as "pep pills," prevented the deterioration in performance when it was given after the second day. If given from the start of the five-day sleepless period, it was not effective. Its action came through its ability to help the men stay awake while performing the tasks.

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DENTISTRY

Penicillin Reduces Caries

➤ BRUSHING your teeth with a tooth powder containing penicillin may make you less likely to have cavities, or dental caries.

That is the promising report of two doctors who used 252 human guinea pigs to study the use of penicillin as a weapon against tooth decay. In the experiment, 161 boys from a northern Ohio industrial school brushed their teeth for five months with a powder containing penicillin. At the end of the period, the doctors made counts of the number of *acidophilus bacilli* in the boys' mouths. This bacillus forms the acids which cause tooth decay.

Of the boys who had used penicillin in their tooth powder, 65% had a lower bacillus count, while only four percent had an increased count. Among the boys who had not had the penicillin powder, 43% had fewer bacilli and 20% had a higher count.

Drs. Thomas J. Hill and Albert H. Kniesner of the Western Reserve University School of Dentistry explained that the experiment will continue another year.

"This study does show that penicillin produces a decrease in susceptibility to dental caries," Dr. Hill declared. "We can not say now whether we will be able, at the end of our studies, to recommend the inclusion of penicillin in dentifrices for the prevention of tooth decay.

"We want more positive results, but I believe we will get them," he added.

The doctors explained that every time a boy brushed his teeth with the powder, he took between 500 and 1,000 units of penicillin into his mouth. This is a very small amount of the drug.

Another experiment with penicillin and tooth decay revealed that rats taking penicillin in drinking water had fewer cavities in their teeth than control animals, which received no penicillin.

The studies are being made under grants from the U. S. Public Health Service and the Cleveland Dental Society.

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ZOOLOGY

Roman-Nosed Rodents Flown Up from Haiti

➤ A PAIR of Roman-nosed rodents from Haiti have just been added to the population of the Chicago Park District's Zoo in Lincoln Park. Their everyday name is Hutia; to zoologists they are Capromys, which translates into English approximately as "goat-mouse."

That goat-mouse reference may be an allusion to their climbing proclivities. Hutias spend a good deal of their time in trees; so in the Lincoln Park Zoo they have been put in the monkey house and given a tree limb to climb around on. They eat almost anything—fruits, leaves, bark, as well as small animals. They have a special liking for lizards.

A pair of Chicago writers, Mr. and Mrs. Oden Meeker, made arrangements for the acquisition when they were touring in Haiti, and the animals were brought to Chicago by plane.

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RARE RODENT—From Haiti, this tree-climbing animal was formerly believed extinct.

MEDICINE

Strain on Heart Measured

Effect of emotions on heart and blood vessels can be measured by change in size of fingers and toes. Doctors hope to learn what wears out the heart.

➤ THE CASE of a healthy young man who could raise his blood pressure at will, simply by thinking about his girl, was reported by Drs. George E. Burch and Clarence Thorpe Ray of New Orleans at the meeting of the American Medical Association in Atlantic City.

His case was significant because when his blood pressure went up under the influence of exciting thoughts, the doctors could detect and measure a change in the size of his fingertips.

The fingertip change resulted from the effect of excitement on his heart and blood vessels.

Doctors have long known that excitement and other emotions, such as fear, anger and worry, can raise the blood pressure and cause heart and blood vessel changes. But they have never before had such an accurate method of measuring the effects of emotions on the heart and blood vessels.

High blood pressure and heart disease might, in some cases, be prevented by such a method. It might be used to detect unconscious worry or fear before these emotions can cause permanent, damaging change to heart and blood vessels.

Then the doctor could apply psychiatric methods to help the patient overcome his unconscious fears and escape the damage they can cause.

The fingertip change is measured by a newly-devised instrument, the plethysmograph. Plethysmo means increase; graph means record. The Cambridge Instrument Company made it according to Dr. Burch's design.

The patient's finger, or toe, is placed in a small glass cup which is sealed around his finger. As the heart beats, pumping blood into the finger, the finger expands. This forces a tiny bit of air out of the cup into a tube and to a recording device. The air writes a record of the change in size of the finger as the blood flows in and out. Emotion which narrows the blood vessels in fingers and toes reduces the amount of blood flowing into them and changes their size.

These changes, very minute, are constantly going on in all of us. Our small blood vessels, at the ends of our fingers and toes, are in a constant changing state of turmoil, Dr. Burch said. The ringing of a bell, the slamming of a door, someone coming into a room, all cause changes in the blood vessels of fingers and toes. They show on the plethysmograph.

From study of these records, the doctors hope to learn which changes are normal and necessary and which produce the "subtle but repeated wear and tear" that ultimately results in disease of the heart and blood vessels.

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MEDICINE

Gland Chemical Gets Trial

➤ FIRST USE on a human subject of a recently purified gland chemical was announced at the meeting of the Association for the Study of Internal Secretions.

The human guinea pig was a normal young woman. She was given the chemical for a month at the Mayo Clinic.

The chemical is the adrenocorticotrophic hormone. It is produced by the pituitary, small gland at the base of the brain. It acts on another part of the glandular mechanism, the adrenal glands above the kidneys which in turn produce adrenalin and other powerful hormones.

The experiment with the young woman serving as guinea pig showed that the hormone stimulates human adrenal glands as well as animal and that pituitary hormone extracted from animals can be used in man.

The experiment was reported by Dr. H. L. Mason of the Mayo Clinic and Dr. C. H. Li of the University of California.

Next step, the scientists said, will be to use the hormone in a patient whose adrenal glands are not functioning efficiently. They cautioned, however, that the adrenocorticotrophic hormone cannot be obtained at present for clinical work.

For the month-long experiment at Mayo Clinic, the pituitaries of 15,000 sheep were required. However, Dr. Li, who isolated the adrenocorticotrophic and three other hormones, indicated that future research may result in better extraction methods, with some hope that the pituitary hormones some day will be available for clinical use.

The adrenocorticotrophic hormone is produced by the pituitary to stimulate the action of the adrenal glands, the two flat ductless bodies located one above each kidney. General debility, a decreased utilization of protein and a disruption of body metabolism result from a deficiency of this hormone. Diabetes is also associated with the adrenals.

Twenty-five milligrams of the hormone per day was found to be sufficient to produce significant stimulation of the adrenals. The amount of stimulation was determined by analyzing certain steroid compounds in the urine, which provide an indication of the activity of the adrenals.

The adrenocorticotrophic is one of four pituitary hormones which cannot be synthesized, but has been isolated in pure form by Dr. Li. The other three are the growth, lactogenic, which stimulates lactation in mothers, and the luteinizing hormone, which stimulates the growth of cells forming the outer envelope of the fertilized ovum in pregnancy.

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VETERINARY MEDICINE

Fowl Tick Spreads Serious Poultry Disease

➤ A SERIOUS poultry disease known as fowl spirochetosis is transmitted by the bite of the fowl tick, a widely distributed parasite of birds, states A. L. Burroughs in *Science* (May 30). Experiments he performed in the economic zoology laboratories of the University of Minnesota proved conclusively what had been strongly indicated in earlier work by other researchers.

The organism that causes the disease is a corkscrew-shaped germ fairly closely related to the one that causes syphilis in human beings. Once its numbers are built up sufficiently in a chicken's blood, the bird becomes droopy and inactive, loses appetite and weight, and develops diarrhea. If it recovers it will be immune to the disease for a long time. The death rate in a flock may be high: Mr. Burroughs cites Old-World onsets that wiped out from 60% to 90% of afflicted flocks.

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ARCHAEOLOGY

Mayan Art Discovered

Burial mound yields centuries-old work of craftsmen who lived before Columbus. Finest piece of Mayan jade yet found was uncovered.

➤ ART WORK, produced centuries ago by Mayan craftsmen, has been dug out of a burial mound in Guatemala in the latest discovery of American archaeologists probing the ruins left by a people who prospered in northern Central America and southern Mexico hundreds of years before Columbus.

Works in jade and pottery, some of the finest Mayan pieces ever found, have been uncovered in the tombs near the village of Nebaj in northern Guatemala by Carnegie Institution of Washington scientists. The find was made in the same region where Carnegie Institution archaeologists and the United Fruit Company expedition have reported the discovery of many Mayan temples in recent months. The temples were located in the southern frontier region of the Mexican state, Chiapas, north of the little-known Guatemalan highlands.

One of the prize finds in the mound was a plaque or breastplate described as the finest example of Mayan jade yet discovered. The piece is a highly polished plate, one inch thick, four inches wide and six inches long. On it are carved a priest or ruler seated on a dais decorated with a human face and astronomical symbols. Faces of Mayan gods are carved around the border of the apple-green and white piece of jade.

Estimated age of the plate is a thousand years. Art uncovered in excavating the single mound is believed to cover some seven to eight centuries.

Excavation of the mound was directed by A. Ledyard Smith of the Carnegie Institution. While the scientists dug out the tombs, descendants of the ancient Mayas, Indians who still live in the region, continued to worship at the mounds, including the one under excavation.

At the ancient village, Nebaj, 20 mounds have been discovered, but the one probed recently was only the second to be excavated by archaeologists. In ancient times, shrines or temples crowned the mounds, but they were built of wood and have long since disappeared.

The rainy season has ended the present work on the Mayan site, but new excavations are expected to be made later. Postwar revival of interest in the most brilliant pre-Columbian Americans is giving important new knowledge about the life and achievements of the ancient Mayas.

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CHEMISTRY

Black Uranium Brick Born in Archery Shed

➤ A BLACK BRICK was proudly displayed by Chairman David E. Lilienthal of the U. S. Atomic Energy Commission to editors attending the Inland Daily Press Association meeting in Chicago.

He explained that the brick was made of uranium and that the first successful production of uranium metal for nuclear fission was accomplished in the Midwest, at Iowa State College, Ames, Iowa. But Mr. Lilienthal did not tell the editors about a long wooden shed where coeds used to practice archery in physical education classes.

Maybe Mr. Lilienthal dosen't know about the shed that jumped out of Robin Hood into the atomic age.

The historic shed is hidden among imposing college buildings on the east side of the large campus of Iowa State College. Before Pearl Harbor, bales of hay were piled at one end of the shed with a target for college girls to shoot arrows at.

Then one day in 1942, the hay and target were taken out and coeds left the shed. Workmen constructed partitions inside, while armed guards stood watch 24 hours a day.

In the shed and in a carefully-guarded section of the college's chemistry building, scientists were working on purifying uranium. Under the direction of Dr. F. H. Spedding of the college chemistry faculty, they developed a process for making uranium pure enough to be used in nuclear fission. Uranium went from the former archery range to Chicago's Stagg Field for the first chain reacting pile.

The process developed in the wooden shed at Iowa State College was used to produce uranium for the chain reacting piles from which came the stuff of the atomic bombs dropped on Japan.

Mr. Lilienthal's black brick was born in the shed where coeds used to shoot arrows.

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JADE PIECE—This breastplate is the finest piece of Mayan jade ever found. It shows a priest talking to a man, apparently attempting to show the insignificance of the man by making him so small.

CONSERVATION

Russian Farmers Replant Shelterbelts on Steppes

➤ SHELTERBELTS protecting farms on Russia's steppes, systematically destroyed by the enemy during the war, are now being replanted by the farmers, states the USSR Information Bulletin, published in Washington. These tree belts perform much the same function as those on the American plains, which are like the steppes in many respects. They reduce wind erosion, hold snow until it can melt, and check hot winds in summer.

Dramatic evidence of the value of shelterbelts was given in the Odessa region last spring. Fragments of the tree zones that had escaped the havoc of war saved the grainfields in their lee when dust storms raged. Elsewhere, heavy layers of dust smothered the crops.

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CHEMISTRY

Thermal Process Fixes Nitrogen as Nitric Oxide

➤ FIXATION of atmospheric nitrogen as nitric oxide (NO) is accomplished without use of electricity, by thermal means alone, in a twin furnace on which Dr. F. G. Cottrell, well-known Washington scientist, has received patent 2,422,081.

The gas mixture is passed through a bed of incandescent oxide "pebbles", further heated in the combustion chamber, then suddenly cooled by being passed into the second chamber and into its bed of unheated pebbles.

When the cooling bed has become entirely hot, the process is reversed, and the now cooled-off first bed is used for quenching. Rights in the patent are assigned to the Wisconsin Alumni Research Foundation.

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ELECTRICAL ENGINEERING

Scientists Help Navy Plan Better Lighting for Ships

➤ CIVILIAN illuminating engineers are helping the Navy plan stronger lighting fixtures and better lighting for Uncle Sam's fighting ships.

Normal home and office lighting fixtures cannot stand up under the shock of a ship's guns firing. Wartime substitute fixtures, without glass, did not do as good a lighting job as commercial fixtures ashore.

Twenty civilian engineers are serving in an informal advisory capacity to help the Navy solve the lighting problem. Experiments have been conducted aboard two inactive ships, the USS Phoenix, a light cruiser, and the submarine, USS Permit. Seven of the engineers also went on a cruise aboard the giant aircraft carrier, USS Midway, to study special lighting problems aboard carriers.

In addition to developing more durable shipboard lighting fixtures, the study includes the problem of lighting in relation to the colors of decks, bulkheads and furniture, heat generated by lamps and the effect of salt air on lighting fixtures.

Lighting aboard Navy ships has become more important because portholes, which let in sunlight, are on the way out. During the war, port-holes were sealed and the Navy said none of the newer ships have them. This means shipboard lights must operate 24 hours a day in some cases.

Experimental designs have been developed and some fixtures have been installed for service tests, the Navy reported.

Science News Letter, June 21, 1947

TEXTILES

Rayon Hosiery Yarn Made in Record Time

➤ THE YARN from which rayon hosiery is made can be turned out in two minutes and 15 seconds instead of 60 hours, using an automatic machine developed in Germany.

American investigators studying the German textile industry have reported the development of the Dureta machine and process which speeded the production of German rayon hosiery. As used at the Bemberg-Wuppertal plant at Dormagen, Germany, the machine was expensive to operate and maintain, but the Germans said improvements in it might revolutionize yarn production.

In the process, yarn is produced without being touched by hand. The yarn is described as of high quality, good tenacity and elongation, and up to 80% of the yarn will make first-grade stockings.

The Dureta machine has 204 spinning funnels in three rows of 68 funnels and corresponds to half of a spinning machine. Threads in the machine are processed automatically.

Science News Letter, June 21, 1947

IN SCIEN

BACTERIOLOGY

Germs May Be Bred To Make War on Disease

➤ MORE DISEASE remedies of the penicillin type may be developed by breeding germs to produce chemicals that will fight other germs, Sir Howard Flory, the English doctor who with his wife was first to use penicillin as a remedy, told members of the American Medical Association at their meeting in Atlantic City.

He cited Swedish efforts along this line. No such remedy, made by "inducing" germs to produce it, has yet been developed. But efforts to do this are "clearly worth while," he said, because it might be possible to produce remedies against specific germs.

Hundreds of substances produced by molds, fungi and bacteria which act against germs have been discovered. Only a few, however, are useful in treating disease. Some are too weak in their anti-germ action. Others are too poisonous.

Looking for a new remedy like penicillin or streptomycin is "something like taking a ticket in a lottery," Sir Howard said.

"It is quite possible that there are some tickets with prizes still."

Science News Letter, June 21, 1947

ENTOMOLOGY

Poisoned Peanut Shells Kill Alfalfa Snout Beetles

➤ POISONED peanut shells are the strange Borgian banquet offered to the alfalfa snout beetle, an introduced pest localized in two New York counties. Before the war they got poisoned raisins; now they have to be content to die on cheaper fare. They may not even get the peanut shells, if new spraying and dusting methods now being tried out by New York State Agricultural College entomologists prove effective.

Despite its name, the alfalfa snout beetle does not confine its attacks to alfalfa. It feeds readily on many plants of the pea and clover family, and on several genera as well. Closest possible control, therefore, is desirable.

Science News Letter, June 21, 1947

NE FIELDS

ENGINEERING

Reverse Shot-Tower Makes Very Fine Metal Powders

➤ A MACHINE for making very fine metal powders is covered by patent 2,422,099, issued to Siegfried Hiller of New York. It might be described as a shot-tower in reverse, with furnace attachments. A wheel covered with steel fingers, revolving in a closed chamber, dips into the surface of a pool of melted lead, tin, copper or other metal, flipping fine drops into an opening near the bottom of a cylindrical combustion chamber. The metal spray is blown upward, only the heavier drops falling back into the pool. The cooling metal particles may be drawn off as such, or may be reacted with chlorine or other gases to form compounds.

Science News Letter, June 21, 1947

MEDICINE

Million Dollars Spent To Test Streptomycin

➤ A MILLION dollars is being spent to test upon actual patients the mold chemical streptomycin, so far the most promising drug for chemical warfare upon tuberculosis.

This raises to two million dollars the research grants by pharmaceutical companies to bring the drug from Dr. S. A. Waksman's test-tube to the patient's bedside, John S. Zinsser of Sharp and Dohme, Philadelphia, told the American Drug Manufacturers Association in Hot Springs, Va., in his presidential address.

While leading medical men work with the National Research Council and the Trudeau Society in this streptomycin evaluation, other antibiotics may soon break forth from the laboratory, Mr. Zinsser predicted.

Other antibiotics that are promising include: Subtilin, bacitracin and tomatin. Penicillin is in wide usage. Tyrothricin is in the early stages of clinical testing and limited use.

In addition to such new drugs, medicine will find some of the almost discarded drugs return to new usage because of researches now in progress, Mr. Zinsser also forecast.

The future demand for insulin may outrun the present sources of supply, Mr. Zinsser warned. Due to this drug that controls diabetes, the diabetic now has a life expectancy only slightly less than the average for all citizens, contrasted with only six years of life for a person of 30 in the pre-insulin era.

Scientists and drug manufacturers are seeking new materials, new sources of pancreas from which insulin is extracted, and new processes for getting greater yields from present raw materials.

Science News Letter, June 21, 1947

CHEMISTRY

New Process Obtains Maleic Acid from Furfural

➤ FURFURAL, that versatile chemical made from such agricultural wastes as corncobs and oat hulls, gets turned into almost everything nowadays. Newest are maleic acid and its kin-compound, maleic anhydride.

They are produced by contacting furfural vapor at moderately high temperatures with a catalyst containing ammonia and its vanadium and molybdenum salts, preferably deposited on metal tubes. Patent 2,421,428, issued on this process to Erik R. Nielsen of Chicago, is assigned to the Quaker Oats Company.

Science News Letter, June 21, 1947

MEDICINE

Lack of Vitamin A Found Related to Tuberculosis

➤ A RELATION between lack of vitamin A and susceptibility to tuberculosis, at least in rats and mice, has been discovered by Drs. A. B. McCoord, C. P. Katsampes, E. Day and S. W. Clausen of the University of Rochester School of Medicine.

The stores of this vitamin in the tissues of mice are lowered by inhalation tuberculosis, the doctors reported at the meeting in Atlantic City of the American Academy of Tuberculosis Physicians.

Rats that do not get enough vitamin A, they also found, are more susceptible to disease than rats with high stores of the vitamin. Animals lacking vitamin A have bronchi that are broader and more irregular in outline than those of animals not lacking the vitamin, and evidences of pneumonia and bronchitis with inflammation are more evident.

Science News Letter, June 21, 1947

INVENTION

Electrical Device Counts Words As They Are Typed

➤ WRITERS who do not like the tedious process of counting words in their manuscripts after they are typed will find the invention of Harold Chaskin of New York very useful. It is an electrical attachment that counts one when any letter key is struck at the beginning of a word, then goes out of action until the space-bar stroke indicates the end of the word. It does not have the disadvantages of earlier word counters operated by the space-bar only, which would count words when the writer was only making extra spaces between sentences. Three patents, Nos. 2,421,681 through 2,421,683 have been issued on this device.

Science News Letter, June 21, 1947

MEDICINE

Soilless Gardens Used To Probe Goiter Cause

➤ FOOD from chemical, or soilless gardens gives fresh evidence that lack of iodine can cause goiter. Studies showing this were reported by Drs. J. F. McClendon and Wm. C. Foster, of Hahnemann Medical College at the meeting in Atlantic City of the Association for Internal Secretions.

In order to produce for the tests a diet free of iodine and to rule out any goiter-causing influence other than iodine lack, these scientists grew the diet in a chemical garden in a disinfected greenhouse with disinfected water and chemicals in a goiter-free region. Air was pumped through a carbon filter.

This diet was fed to six litter-mate rats from a colony that had not had any goiter for six years. The rats were given the diet as soon as they were weaned.

Three were given water redistilled from alkali to drink. The other three were given water containing 10 parts per million of iodine. These last three rats had normal thyroid glands.

The other three, that got no iodine, at the end of 73 days had goiters four times as large as the thyroid glands of the rats that got the iodine in their drinking water.

The goiters of the rats raised without iodine were twice as large as goiters in rats from a colony that ran to goiters living in a goiter region and fed a diet containing very little iodine.

Science News Letter, June 21, 1947

ENTOMOLOGY

Know Your Housefly Enemy

Fly would be gigantic if harmfulness were size. Its supreme ability to fly has helped it become one of our major disease-carrying enemies.

See Front Cover

By DR. FRANK THONE

If flies had physical size in proportion to their harmfulness they would be bigger than rhinoceroses—and a lot more formidable-appearing, too. Seen through the enlarging eye of even a low-power microscope, a fly is a most fearsome-looking object.

A full and detailed description of this dangerous animal would take a book. A quick glance at the principal things about a fly that make it such a menace to man is definitely in order. The more we know about our enemy the more effectively we can fight him.

One of Best Fliers

To begin with, the fly gets its very name because of its supreme ability to do just that: fly. The common fly is one of the most efficient flying-machines in the world, far superior to birds and bats. The few insects that surpass it in the air are members of the same insect order—other species of flies. Compared with a fly, man's most agile airplane seems clumsy. A plane can turn itself upside down, to be sure, and even cruise along that way for considerable distances; but what plane can land upside down on the ceiling and stick there? Yet a fly knows how to do that without teaching, as soon as it gets the use of its wings. As for quickness in takeoff, and ducking and dodging around in the air, no one who has ever swung a fly-swatter needs to be told about these.

Entomologists list the fly in the order known as the Diptera, or two-winged insects. Members of that order have only one pair of wings, as contrasted with the two pairs possessed by most other insects. Where the second pair presumably used to be, in earlier evolutionary days, there is now a pair of short-stalked projecting knobs commonly called balancers. That seems to be their function: at any rate, if one of these knobs is clipped off the fly becomes unable to guide itself in the air, swerving crazily in circles. But so long as its normal apparatus is not interfered with, there's nothing can fly better than a fly.

The fly's landing gear—its six legs—presents a more intricate appearance than its wings, though like all efficient flying-machines it uses them but little in getting about. It doesn't even need to taxi down to the end of a strip for a takeoff run. It just squats down a little, hops up, and is off. It is like a helicopter in that respect, though more like a fighter plane in speed and maneuverability.

Each of the fly's six feet is equipped with two little pads underneath. These have pores through which a sticky fluid oozes out. This is what enables flies to walk on the slipperiest surfaces, even when they are vertical or upside down. Legs and feet of the fly are also covered with an array of fine bristles. These serve as additional catchers for the filth in which the fly delights to wade—and then proceeds to walk around over your food, or the baby's nursing-bottle.

The fly often grooms itself by rubbing its legs together, and licking them with its tongue, cat-fashion. That may clean its feet, but the germ-swarming stuff goes into its stomach, and is either regurgitated when the nasty little insect decides to make a meal off your sugar, or is dropped as a flyspeck almost anywhere. As an unconscious agent of bacterial warfare against mankind, the fly can hardly be improved upon.

FIGHTING FLIES—This aerosol bomb is effective against flies.

What is commonly called the fly's tongue has little resemblance to the tongue as we know it in larger animals. It consists of several distinct parts, set together to form a tube. It is through this that the fly regurgitates liquid from its stomach to dissolve its food, and then sucks it back up again. Very satisfactory for the fly, but not so good for us.

Housefly Can't Bite

Having to get its food entirely by liquefying it and then sipping it up as through a soda straw, the ordinary housefly cannot bite. Many persons, who have been most outrageously bitten by flies, especially just before a thunderstorm, will dispute this statement. But the flies that bite them are of other species that look more or less like the housefly, notably the stable-fly and the horn-fly, which normally live around animals from which they can get the blood that is their usual food. When they sense a storm coming on, however, they are very apt to attempt the riskier venture of trying to fill up on human blood.

The only other notable features of a fly's head—indeed, covering the greater part of it—are its many-faceted compound eyes, that cover the greater part of its head. Under a strong magnifying glass, their surface appears divided up into hexagons, like a honeycomb. This division holds throughout their structure; each eye is made up of hundreds of these six-sided prisms, tapering to narrow points at their inner ends where the sight-nerves are inserted, each with its individual lens at the outer end.

What the fly sees through these eyes is not certain; one would have to be a fly oneself really to know about that. However, it is probable that the fly's-eye view of the world is more or less of a mosaic pattern, rather than a smoothly continuous one such as seen by the eyes of the higher vertebrates, including ourselves.

What is more important, especially from the fly-fighting angle, is the tremendous field of vision, very much wider than our own. A fly can see what is going on in front, on both sides, and to

some extent even behind, so it is able to spot danger approaching from almost any point. It interprets any movement of any object in its neighborhood as hostile, and takes off immediately.

This very wide field of vision is what makes flies have such a preference for roosting on the ceiling, on projecting wall and door-jamb edges, and especially on hanging strings and wires. From such vantage-points it can see in all directions. Also, it has a choice of flight in all directions if anything threatens it.

Knowing this tactical choice of the fly enables us to put DDT on just the places where the fly is most likely to settle.

Science News Letter, June 21, 1947

HOW TO GET RID OF FLIES

DDT, best present weapon against flies, can be used to advantage in two different ways, for ordinary indoor applications:

Use the handy aerosol mist bomb, which contains pyrethrum as well as DDT, for quick knockdown and sure kill of flies in a room. Shut windows and doors, open the discharge valve, and swish the spray around for a few seconds. Then leave the room and keep the door shut for about half an hour.

Use a 5% solution of DDT in odorless kerosene to spray on ceilings, upper parts of walls, and other roosting-places of flies. Brush it on screen doors and window screens, frames and all. This leaves an invisibly fine deposit of DDT crystals, which clings to flies' feet when they walk on it. In an hour or less they become paralyzed and die.

You can buy this 5% spray ready mixed, or you get a concentrated solution of DDT in xylene, for dilution to 5% on your own workbench. When using these sprays, be careful to extinguish all open lights and fires beforehand, and above all, don't smoke. Mists and vapors of kerosene are inflammable.

Spray the outside of the house around doors and other openings where flies try to get in. Spray the dog kennel, chicken house and any other outbuildings where flies gather. These residual sprays remain capable of killing flies for as much as five or six months after application.

MEDICINE

Blood and Plasma To Be Available to All Soon

➤ BLOOD AND PLASMA which saved the lives of thousands of American fighting men in World War II may be available to all Americans anywhere in the country without charge within three to five years.

Chairman Basil O'Connor of the American Red Cross announced the National Blood Program at the opening of the Red Cross convention in Cleveland.

Explaining how modern medicine and surgery use blood in the treatment and prevention of disease as well as in the front lines of war, Chairman O'Connor said his group's program has the support of medical and health leaders.

The Red Cross will continue its wartime work in collecting blood donations. Within three to five years, the program could make blood and plasma available throughout the country, Mr. O'Connor predicted.

Science News Letter, June 21, 1947

AERONAUTICS

Two Small Planes Used To Make One Big One

➤ MAKING a big plane out of two small ones, plus a stub-winged glider, is the interesting invention of a former member of the Air Transport Command, O. A. Buettner of Pittsburgh, on which U. S. patent 2,421,742 has been granted. Rights are assigned royalty-free to the government.

Recesses are sunk into the upper surfaces of the glider's truncated wings. One wing of each of two fighter planes is latched into these recesses, linking all three together as one large craft. The glider can be used for transporting troops or supplies, or it can be made into a huge fuel reservoir, enabling fighters to accompany bombers on long raids, so that they can go into action with their own tanks full after jettisoning the emptied glider.

Science News Letter, June 21, 1947

CARTOGRAPHY

Map Measuring Distances And Areas in Terms of U. S.

➤ HOW FAR is it from Omsk to Tomsk? Are the Urals longer or shorter than the Alleghenies? How big is Baluchistan? Questions like these can be answered in terms of U. S. A. distances and areas by means of a new globe on which Homer V. Johannsen of Chicago has received patent 2,422,101. Along with the globe, mounted on a curved rod, is a map of the United States on the same scale and degree of curvature. It can be superposed on any part of the globe for comparison purposes.

Science News Letter, June 21, 1947

MEDICINE

Multiple Sclerosis Produced in Monkeys

➤ PATIENTS suffering from the "brutal" and always fatal disease, multiple sclerosis, are getting an answer to their plea, "Why doesn't someone do something about this disease?"

Someone has done something. Dr. Elvin A. Kabat and associates at Columbia University and the Neurological Institute in New York have found a way to produce the disease in monkeys and a clue to the cause of the disorder.

To help them push their research further, with the ultimate aim of finding a cure or preventive or both, the Association for Advancement of Research on Multiple Sclerosis has just made its first grant of $64,350.

The Columbia doctors found they could produce the disease in monkeys by injecting a bit of the animal's own brain tissue into their bodies. This has led to the theory that in human patients accidents or germ diseases might cause a tiny bit of the brain tissue to be dislodged and start travelling through the body in the blood stream.

When this happens, if it happens, the body would react to it as it does to any foreign protein substance. Familiar examples of reaction to minute amounts of foreign protein are the allergies such as hives, hayfever and migraine headaches. Multiple sclerosis is believed, on the basis of the monkey experiments, to be the result of such a reaction, which doctors term the antibody-antigen reaction.

Science News Letter, June 21, 1947

Do You Know?

Cotton *linters* are being used in paper-making to meet a shortage in rags.

Apply two thin coats of *shellac* rather than one thick coat, experts advise.

Rags used in making high-grade white *paper* must have all color dye removed before processing.

Cincinnati prohibits *smoking* in elevators and in all retail stores employing 25 or more persons.

Danger from whirling electric *fans* is lessened if they are painted red or yellow to make them conspicuous.

Smoke from a diesel engine can be due to overload, wrong fuel, too early or too late fuel injection, or too low or too high compression.

Insulated *aluminum* wire, developed for use in airplanes because of its lightness, is now being used in place of copper in many installations.

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DIABETICS

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AGRICULTURE

Soybean to Feed Livestock

In midwestern regions, where rains harmed the corn crop, the soybean will go to the rescue for livestock feeding. Scientists are doing research on it.

➤ THE SOYBEAN, that versatile vegetable that is probably the Orient's most valuable gift to Occidental agriculture, may do a rescue job in parts of the Midwest where May frosts and June flood-rains either prevented corn planting or drowned what was planted. Even if the beans do not mature, the crop can be cut green and either dried for hay or put into the silo, providing something for livestock to eat.

Soybeans were used as a catch crop in the Midwest half a generation ago, when heat and drought brought to grainfields the disaster that is now threatened by recent cold and present wet. During the mid-thirties, drought not only discouraged grain growth; it encouraged a double plague of grasshoppers and chinch-bugs.

The latter were especially bad; they moved like a crawling carpet, and when they struck a growing field the young grain went down as before a fire.

Knowing that chinch-bugs attack only grains and grasses, farmers plowed up their ruined grainfields and planted soybeans, even after mid-June. Thus a desperate situation was prevented from becoming wholly hopeless.

Expansion in Planting

This emergency brought about the greatest expansion in soybean planting that the country has ever seen. In Iowa, for example, the acreage devoted to the crop during the first of the really bad drought years was between seven- and eight-fold that of the previous year. Having thus been roughly introduced to the soybean, the farmers found the acquaintance profitable and have faithfully continued to cultivate it.

Agricultural scientists are giving the soybean the attention merited by the friend in lean years that becomes a source of wealth in better times. At Urbana, Ill., a U. S. Department of Agriculture plant pathologist, W. V. Allington, is applying wartime observation methods to the finding of enemies of the soybean. Flying his own light plane above soybean fields, he takes air photographs that show up fields infested with a fungus disease, brown stem rot, as lighter areas than the healthy, dark-green fields. Location of the infected fields indicates that farmers who plant soybeans several years in succession are simply exposing their seed to soil where the fungus lurks.

A minor but widely known use of soybeans is in the production of the salty, tangy sauce, often called "dragon's blood", that you get with every serving of chow mein or chop suey. The Department's Northern Regional Research Laboratory at Peoria, Ill., now has four certified strains of the microorganisms used in fermenting this soy sauce. They are two molds, a bacterium and a yeast. They are to be maintained in pure culture, to supply any manufacturer of soy sauce whose own stock cultures have become contaminated with "wild" organisms floating in the air.

A Chinese scientist, Pei Sung King of the Chinese government's National Bureau of Industrial Research at Chungking, aided in the selection of these strains. As a guest worker at the Peoria laboratory, he suggested various methods of soy-sauce fermentation which his American colleagues tested and compared in working out the method they now recommend to manufacturers in this country.

Department of Agriculture chemists have worked out an extraction method that uses ethyl or grain alcohol to get the oil out of ground-up soybeans, instead of the light petroleum fractions hitherto in use.

Science News Letter, June 21, 1947

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MEDICINE

Cancer Treated With Gold

➤ CANCER and leukemia patients are now being treated with radioactive gold from the chain-reacting uranium pile that created the atom bomb.

"Results in chronic cases (of leukemia) have been equally good if not better than results obtained with X-rays," Dr. Paul F. Hahn, associate professor of biochemistry at Vanderbilt School of Medicine, declared at the isotope conference in Nashville. The conference was held at Vanderbilt University in cooperation with the Clinton Laboratories and the Oak Ridge Institute of Nuclear Studies. Leading scientists have discussed use of radioactive chemicals as tracers and in treatment of disease.

A total of 33 leukemia patients and 30 miscellaneous tumors have been treated so far. Favorable results have been obtained in leukemia of the chronic variety only.

Two leading advantages of the treatment over X-rays, Dr. Hahn said, are the lack of radiation sickness and the simplicity with which the radioactive material is given.

In leukemia, the radioactive gold is injected into the patient's vein. In the case of a tumor or cancer it is injected into the tissue so as to infiltrate the tumor with the radioactive material. Time in hospital and expense are saved. The treatment can be given in a few minutes and the patient can then go back home or to work if necessary.

It costs only about $5 for enough radioactive gold to produce a "satisfactory remission," or temporary improvement such as X-rays give, in certain types of chronic leukemia.

When the radioactive colloidal gold is infiltrated into tumors, it remains fixed at the site where it was deposited. The tumor is then constantly bombarded with rays from the radioactive gold, something as is the case when a radium needle is deposited in or near the tumor for a time. The use of radioactive gold, however, eliminates many of the undesirable features accompanying the use of radium under similar circumstances, Dr. Hahn said.

Dr. Hahn and his assistant, Dr. C. W. Sheppard, have been conducting a cancer and leukemia treatment program for the past 20 months. At first they used radioactive colloidal manganese made in the cyclotron. This had the disadvantage of a relatively high cost. When material from the uranium pile became available, they shifted to use of radioactive colloidal gold. This decreased the cost of treatment to about two per cent of the former cost.

Vanderbilt University's nearness to the uranium pile at Oak Ridge makes it a logical center for work of this kind, Dr. Hahn pointed out. At present Vanderbilt is receiving more radioactive material from Oak Ridge than any other medical school in the United States.

Science News Letter, June 21, 1947

NEW ARISTO CHRONOGRAPH

FEATURES

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AGRICULTURE

Illinois Introduces New Lincoln Hybrid Soybean

➤ ILLINOIS has had the honor of introducing a new hybrid soybean, appropriately named for her most distinguished citizen, Abraham Lincoln. The Lincoln soybean averages three bushels per acre better than other soybeans, and the beans themselves contain one-half per cent more oil. It is therefore claiming increasingly greater acreages for itself, though it was introduced only five years ago.

Science News Letter, June 21, 1947

AERONAUTICS

Radar Equipment to Give Safety from Mountains

➤ SAFETY TO airplanes from mountains ahead is promised by new airborne light-weight radar equipment which will be in production by 1948, Comdr. W. C. Hilgedick, U. S. N., told the joint meeting in Washington of the International Scientific Radio Union, American Section, and the Institute of Radio Engineers.

This radar equipment, which weighs 150 pounds, can be used effectively in dodging bad weather ahead, such as thunderstorms and conditions favorable to the formation of ice on the plane. It can be used also in beacon navigation, beacon low-approach for landing, and to avoid collisions in the air with other planes. For the last purpose, however, its usefulness is limited because radar echoes from another plane are weak and easily unnoticed.

The new equipment is built on specifications prepared by the Army, the Navy, and American Airlines, serving as consultants. The object sought was the most desirable type of radar for transport aircraft. The instrument which the Navy expects to have in production early next year will be known at the AN/APS-42 equipment.

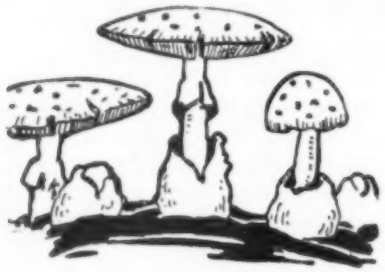
For terrain clearance a pencil-beam is used, Comdr. Hilgedick stated. This circles around the aircraft like a searchlight, and in effect presents a safety circle within which no echo should be received without danger. On the radar scope, the pilot has at a glance a picture in overcast weather as quickly and easily understood as if he looked through a windshield on a clear day.

The beacon navigation program of the Army and Navy includes installations up and down both coasts and across the southern overland route. These beacons are coded and can be flown across the face of the radar scope just as clearly as flying a searchlight beacon course in good weather. In the beacon low-approach, two small beacons are used, one at each end of the runway. This allows a pilot to line up with the proper runway before let-down.

Science News Letter, June 21, 1947

BOTANY

NATURE RAMBLINGS by Frank Thone



Mushrooms are Toadstools

➤ THERE IS NO sure way of distinguishing between mushrooms and toadstools, simply because there is no distinction between them. Mushrooms are toadstools and toadstools are mushrooms. Both names are words descriptive of a plant of a certain shape. Any fleshy fungus with a cap and a stalk is a mushroom. It is also a toadstool. The common field agaric, which is the only species cultivated and sold, is an edible toadstool. The fly-agaric, so called because a sweetened decoction of it was formerly used as a home-made fly-poison, is a deadly mushroom. To parody Gertrude Stein just once more: a mushroom is a toadstool is a mushroom.

If you're going out a-gathering mushrooms, you will of course want to know which ones are good to eat and which are poisonous. Regrettably, there is no easy rule-of-thumb test for toxicity in mushrooms (or toadstools).

The old one about mushrooms with white gills being safe and those with black gills being poisonous is just about as far from the facts as it can get. The ordinary mushrooms of the market have black gills when they become mature, and so do the even tastier wild inky-cap mushrooms—as indeed their name indicates. On the other hand, the genus Amanita, which has only one edible species, all the others being extremely poisonous, is innocently white underneath all the days of its brief life.

Other tests, like turning a silver spoon black, and easy peeling of the skin off the cap, are equally unreliable. One test, which classifies as poisonous all mushrooms with loose scales on the cap, is good as far as it goes, for loose scales, remnants of the veil that hangs at midstalk, are one of the marks of the Amanitas. But there are other poisonous genera that do not have these scales; moreover, a heavy rain sometimes washes the scales off an Amanita cap, leaving it smooth and glistening.

No; the only way to tell poisonous from edible mushrooms is to learn how to identify them, species by species. That is less work than you might think; thanks to the widespread interest in the subject there are several good books for the amateur mushroom hunter, and a considerable number of useful pamphlets, published by state agricultural experiment stations, museums, and so on. Armed with one of these, and using reasonable caution you can get many a tasty food treat free—which is something of a feat, these days.

Science News Letter, June 21, 1947

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AERONAUTICS

"Mudder" Planes Tested With Track-Type Gear

➤ SOME PLANES in the future, like some horses, are going to be good "mudders."

A tractor-track of the endless belt type will be installed soon on the landing gear of an Army cargo plane to test its ability to permit aircraft to land on soft dirt, mud or sand. It is a track similar to that used on caterpillar tractors.

The installation of this track-type landing gear will be on a Fairchild C-82 Packet, a twin-engine, 54,000-pound transport originally designed for use on short, unimproved fields. It has a large rear door through which heavy equipment can be loaded into its box-car like body.

The idea is not entirely new. Track-type landing gear has already been tested on Douglas A-20's. It is now being adapted to the heavy plane. The installation will provide a wide tracked surface on the nose and each main gear, all three to be retractable in the same manner as conventional wheel landing gear.

Science News Letter, June 21, 1947

PSYCHIATRY

One Out of 140 Americans Is Perfect But Boring

➤ ONE out of every 140 Americans is perfect, Dr. Earl D. Bond, University of Pennsylvania professor of psychiatry, estimates.

The one million perfect persons in our midst have no anxiety, no fears, no prejudices, no attractive vices, no weaknesses. They will probably live long.

But you probably won't envy them, even if you are one of the two and one-half million neurotics or one of the 133 million Americans unnecessarily handicapped by too much conscience or struggling with feelings of inferiority. For here is how Dr. Bond described them to life insurance medical officials meeting in Ashville, N. C.

Like the few completely insane people, they are not interesting. They don't seem human. They are all perfect and well rounded, "like a string of zeros."

Science News Letter, June 21, 1947

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THE CHEMISTRY OF HETEROCYCLIC COMPOUNDS—Avery A. Morton—*McGraw-Hill,* 549 p., $6. A textbook to provide a broad background for knowledge of this class of compounds.

CORALS FROM THE GULF OF CALIFORNIA AND THE NORTH PACIFIC COAST—J. Wyatt Durham—*Geol. Soc. of Am.,* Memoir 20, 68 p., illus., $1.70. Thirty-seven species of coral from this region are described and discussed. This includes 14 new species and six genera not previously recognized here.

A GLOSSARY OF MOLLUSCAN TERMINOLOGY—Paul H. Reed—*pub. by the author,* 30 p., paper, $1. Compiled by the author from his library, and acknowledged as preliminary.

RADIOACTIVE TRACERS IN BIOLOGY: An Introduction to Tracer Methodology—Martin D. Kamen—*Academic Press,* 281 p., $5.80. This text to provide a review of the concepts of nuclear physics for biologists, to present a critical survey of existing tracer methods, and to indicate both potentialities and limitations of these methods will serve to bridge the comunications lag between new developments and those not immediately connected with them.

RECLAIMED RUBBER: The Story of an American Raw Material—J. M. Ball—*Rubber Reclaimers Assn.,* 248 p., illus., $5. A history of this industry and the important part it has played in our national economy.

THE RISE AND FALL OF THE MIDDLE KINGDOM IN THEBES—H. E. Winlock—*Macmillan,* 174 p., illus., $5. A reconstruction of the period from the Eleventh through the Sixteenth Dynasties from the scanty available evidence.

WESTWARD HOW! Through the Scenic West.—Fred Bond—*Camera Craft,* 324 p., illus., $6.95. This book, for camera fans, plans numerous routes for driving through different sections of the Far West so that the visitor may make the best of his time and see all the majestic scenery en route. Complete descriptions of the various types of places to visit and photographs showing samples of the scenery add to its usefulness.

WILDCAT CARTRIDGES—Richard F. Simmons—*Morrow,* 333 p., illus., $5. An analysis of over 200 experimental cartridges produced by handloaders and gunsmiths. Most of the present popular and efficient standard cases started out as "wildcats".

Science News Letter, June 21, 1947

PSYCHOLOGY

Athletics for Development

➤ PSYCHOLOGICAL kinks which often develop in men deficient in physical ability might be avoided if more attention were devoted in childhood and adolescence to improving skill in athletics.

This is one of the conclusions of a study of 17-year old boys by Dr. Harold E. Jones, director of the Institute of Child Welfare at the University of California.

The present system of physical education is excellent for producing championship athletes, Dr. Jones asserts, pushing to ever greater heights the performance of those well endowed physically.

But there would be many psychological as well as physical advantages, he believes, to a system of physical training directed more especially towards those who are of sub-average physical ability.

Prowess in athletics is one of the chief sources of prestige among adolescent boys, and this is partly related to the fact that strength and other aspects of physical ability are closely joined to such favorable traits as activity, aggressiveness, and leadership.

"Under present conditions many of those who most need training become spectators," Dr. Jones states, "and those who least need it become performers. If physical education is to be judged in terms of its success with those who have greatest need, that is, with those who are naturally less proficient, some question may justly be raised as to the adequacy of the methods now in effect.

"A program more specifically and more intensively adapted to individual needs should compensate, to some extent, differences due to biological factors, and enable the physically less gifted to compete on somewhat more even terms with those having initial physical advantages.

"It is idle to expect differences to be eliminated or even very greatly reduced, but at least we might achieve a system in which these differences are less vigorously promoted."

Science News Letter, June 21, 1947

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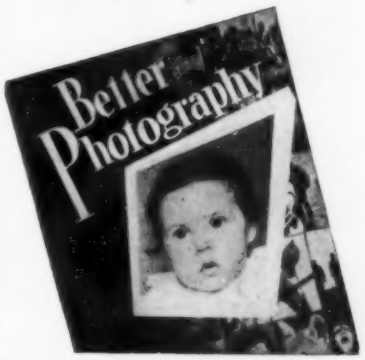

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• New Machines and Gadgets •

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⚙ *WINDOW SCREEN that eliminates sun-glare, interferes very little with the view when looking out but does limit the view from the outside looking in. Resembling somewhat a Venetian blind, it is made of tiny, one-inch-long slats of aluminum or bronze, placed close enough together to keep out insects.*

Science News Letter, June 21, 1947

⚙ *NYLON-SHAFTED screwdriver is an insulated tool for use with electronic equipment and in other electrical work. The shaft is rigid and strong, is heat-resistant and does not absorb moisture. Made of nylon, it will not mar soft metals.*

Science News Letter, June 21, 1947

⚙ *DIAL MARKINGS in automobiles are plainly visible at night without glare when "lighted" by infra-red rays which activate fluorescent paint on them. A standard six-volt bulb is used, but it is employed in connection with a filter which eliminates the high reds from the spectrum.*

Science News Letter, June 21, 1947

⚙ *SLEEPING COVER for baby, recently patented, is the size and shape of the crib, and has a T-shape opening through which the infant's body is placed underneath. A jacket above the opening is fitted over the arms and chest.*

Science News Letter, June 21, 1947

⚙ *RADIO-CLOCK combination is housed in an attractive plastic casing arranged either to stand on a table or hang on a wall. The electric clock, placed in the center of the case, as shown in the picture, cleverly conceals the radio.*

Science News Letter, June 21, 1947

⚙ *REPLACEMENT tapes for Venetian blinds are slipped into place over the ends of the blinds as they hang in the windows, and the soiled tape removed by cutting. A fastening device holds the new tape in position.*

Science News Letter, June 21, 1947

⚙ *DRILLS for boring holes in glass are now available with carboloy cemented carbide cutting tips. As many as 1,000 holes can be made without resharpening, it is claimed. This tip, not as hard as a diamond but the hardest metal made by man, can be sharpened on a special silicon carbide wheel.*

Science News Letter, June 21, 1947

⚙ *FISH-LANDING NET, recently patented, is similar to the ordinary kind used by sportsmen but has a flashlight built into the handle with its lens adjacent to the loop frame of the net. A beam of light may be directed centrally across the frame.*

Science News Letter, June 21, 1947

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What special medical use have soilless gardens? p. 393.

ZOOLOGY

What West Indian rodent can climb trees? p. 389.

Pictures: *Cover, U. S. Department of Agriculture; Lincoln Park Zoo, p. 389; Carnegie Institution, p. 391; Westinghouse, p. 394.*

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